COURSE DESCRIPTIONS

Faculty	Science and Information Technology				
Department	Mathematics			**NQF level**	6
Course Title	Logic and Set theory	**Code**	505245	**Prerequisite**	505111
Credit Hours	3	**Theory**	3	**Practical**	0
Course Leader	Prof. Dr. M.W. Alomari	**email**	malomari@jadara.edu.jo		
Lecturers	Prof. Dr. M.W. Alomari	**emails**	malomari@jadara.edu.jo		
Lecture time	10:00-11:30 Sun -Tue	**Classroom**	D307	**Attendance**	
Semester	First Semester	**Production**	2008	**Updated**	2023

Short Description
This course demonstrates the development of mathematical thought through basic logical structures and the concepts of classes and sets, Functions, Finite and Infinite Sets, Denumerable and non-denumerable Sets, Cardinal numbers, The axiom of choice.
Course Objectives
1-Students who successfully complete this course will be able to understand and apply the basic axioms and concepts of set theory. 2- They will be able to read, write and present theorems and proofs in higher mathematics.
Learning Outcomes
A. Knowledge - Theoretical Understanding
a1. Demonstrate the basic concepts and theorems of set theory.
B. Knowledge - Practical Application
a2. Explain and discuss the cardinality of a set and its subsets.
C. Skills - Generic Problem Solving and Analytical Skills
b1. Apply techniques to solve problems.
D. Skills - Communication, ICT, and Numeracy
E. Competence: Autonomy, Responsibility, and Context
c1. Write mathematical proofs in a clear and concise manner.
Teaching and Learning Methods
E-learning Lecture, Group work, and discussion
Assessment Methods

- Exams
- Quizzes
- Assignments and Class Assignments

Course Contents					
Week	**Hours**	**CLOs**	**Topics**	**Teaching & Learning Methods**	**Assessment Methods**
1	3	a1	Review. The Concept of Set, Some Basic Notations and Definitions Cartesian Products, Relation	By lectures, discussions, and solving selected problems	Quiz, Exam
2	3	a1, b1	Functions (or Mappings): definitions and notations Equality of functions	By lectures, discussions, and solving selected problems	Quiz, Exam
3	3	a1	Inverse function, composition of functions. Types of functions: injective, surjective and bijective.	By lectures, discussions, and solving selected problems	Quiz, Exam
4	3	b1	Solving problems concerning bijective functions Composition of one to one, onto, and bijective functions	By lectures, discussions, and solving selected problems	Quiz, Exam
5	3	a2	The existence of the inverse function the image and the inverse image	By lectures, discussions, and solving selected problems	Quiz, Exam
6	3	a1, b1	Solving different problems	By lectures, discussions, and solving selected problems	Quiz, Exam
7	3	a1, a2	Equipotent sets, equipotent as an equivalence relations	By lectures, discussions, and solving selected problems	Quiz, Exam
8	3	a1,b1	Finite sets.	By lectures, discussions, and solving selected problems	Quiz, Exam s
9	3	b1	Infinite Sets	By lectures, discussions, and	Quiz, Exam

10	3			solving selected problems	
		a1	Infinite Sets (Cont.)	By lectures, discussions, and solving selected problems	Quiz, Exam
11	3	a1	Denumerable sets.	By lectures, discussions, and solving selected problems	Assignment Quiz, Exam
12	3	a1, b1	countable sets	By lectures, discussions, and solving selected problems	Assignment Quiz, Exam
13	3	a2, b1	Cardinal Numbers	By lectures, discussions, and solving selected problems	Assignment Quiz, Exam
14	3	a1, a2	The Ordering of Cardinal Numbers	By lectures, discussions, and solving selected problems	Assignment Quiz, Exam
15	3	a1, b1	The axiom of choice	By lectures, discussions, and solving selected problems	Assignment Quiz, Exam
16	2	Final Exam			

Infrastructure	
Textbook	Jebril, I. H., Dutta, H., & Cho, I. (2021). *Concise Introduction to Logic and Set Theory*. CRC Press.
References	Smith, D., Eggen, M., & Andre, R. S. (2014). *A transition to advanced mathematics*. Cengage Learning.
Required reading	
Electronic materials	
Other	

Course Assessment Plan					
Assessment Method	**Grade**	**CLOs**			
		a1	**a2**	**b1**	**c1**
First (Midterm)	30	12	0	6	12
Second (if applicable)					

Final Exam		50	12	6	12	20
Coursework						
Coursework assessment methods	Assignments	10	3	0	3	4
	Case study					
	Discussion and interaction	5	0	5	0	0
	Group work activities					
	Lab tests and assignments					
	Presentations					
	Quizzes	5				5
Total		100	27	11	21	41

Plagiarism

Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code).
Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.